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(54) **Electric pump for the recirculation of water**

Elektropumpengruppe für eine Wasserzirkulationsanlage

Groupe électropompe pour la recirculation d'eau

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(56) References cited:
EP-A- 0 992 685 DE-U- 29 719 532
FR-A- 2 297 338 GB-A- 472 661
US-A- 5 178 523

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Description

Technical sector of the invention

[0001] The present invention refers to an electric pump for the re-circulation and filtering of swimming pool water, of the type including a suction chamber and a pressure chamber, both of which are connected to one another by a communication conduit, the first being provided with a water suction inlet, wherein the swimming pool water to be filtered and impelled enters, and a filter vessel, into which the water drawn in enters by an upper open inlet and exits by multiple small orifices made in its wall and/or lower base, whereas the pressure chamber comprises an impelling assembly, driven by an electric motor, and a water outlet for the filtered and impelled water.

State of the art

[0002] Well-known in the art are multiple embodiments of pumps for the re-circulation of water, such as those described in FR 2 297 338, US 5 178 523, ES-U 284474, ES-U 291043 and ES-U 9801562 Spanish utility models, in EP 544610 and EP 657602 European patents and in GB 379738 and 500072 British patents. In all of the above, whenever the filter vessel fills up with leaves, papers, plastic or other residues they unfailingly get lodged opposite the orifice of the communication conduit between the suction and pressure chamber and stop up the filter passage in the latter zone adjacent to the perimeter of said orifice, so that the water has to pass laterally by the rest of the filter perimeter, and, of necessity, pass through a narrow crown adjoining the perimeter of the mentioned orifice. This pressure-driven water flow through such a narrow crown produces a loud noise owing to the turbulence originating from the water flow thus increasing the pressure drops and altering the smooth operating of the electric pump.

[0003] Likewise, all the known embodiments of this type of pump have the impeller and the electric pump arranged co-axially and with the shaft in horizontal position. Arranged thus, the suction chamber is never completely full of water, as the air drawn in by the sucked-in water tends to form bubbles in the upper zone of said chamber, where the impeller is to be found, which also produces an increase in the operating noise of the electric pump.

[0004] These two drawbacks constitute a serious problem in the operating of the electric pumps of this type, especially that produced by the stopping-up of the filter vessel, which is even more blatant in very powerful electric pumps, in which the filter vessel walls become deformed by the pressure and rest on the mouth of the communication orifice between both chambers, resulting in the practical closing off of the water flow.

[0005] Even though the operating noise can be in part solved by situating below the filter vessel lower base the abovementioned communication orifice, as in the em-

bodiment described in EP 0992685, another additional drawback is that, for construction purposes, the communication conduit is generally narrow and ends in a narrow cavity in the suction chamber, opposite the impellers, which likewise produces a noise increase in the electric pump.

Explanation of the invention

[0006] The electric pump object of the invention eliminates all the mentioned disadvantages and operates in a very noiseless and efficient way.

[0007] The communication conduit between the pressure and suction chamber in the electric pump of the invention is arranged on a lower level to that of the lower base of the filter vessel, whereby the mouth of said conduit in the pressure chamber is situated below the mentioned lower base of the filter vessel.

[0008] Is characteristic of the invention that the shaft of the motor and of the impeller assembly is essentially vertical and that an ample hollow space is arranged below the lower base of the filter vessel and the impeller assembly and can contain a relatively high volume of water which, once the electric pump has started up for the first time, is permanently housed in said ample hollow space.

[0009] According to another feature of the invention, the walls of the pressure chamber body and the filter vessel walls diverge appreciably from one another, determining a wide annular space between both walls for the circulation of the water.

Brief description of the drawings

[0010] The attached drawings illustrate, by way of non-limiting example, two forms of embodiment of the electric pump of the invention.

Fig. 1 is a side elevation view in section, of a first form of embodiment of the electric pump of the invention;

Fig. 2 shows a side elevation view in half-section, of the lower support part of the first form of embodiment; Figs. 3 and 4 show respectively a lower plan and a plan diagrammatic view, of the electric pump of Fig. 1; and

Figs 5 and 6 illustrate a second form of embodiment of the electric pump object of the invention, in respective and similar views to those of Figs 1 and 4.

[0011] In said drawings it can be appreciated that the electric pump in question includes a suction chamber 1 and a pressure chamber 2, connected to each other by the communication conduit 3.

[0012] The suction chamber 1 is provided with a suction inlet 4, wherein the water to be filtered and driven enters, and a filter vessel 5 in which the water drawn in enters by its upper open inlet 6 and exits by multiple small orifices made in its wall 7 and in its lower base 8.

[0013] The pressure chamber 2 includes an impeller assembly 9, driven by a coaxial electric pump 12, and an outlet 25 for the filtered and impelled water.

[0014] The communication conduit 3 between the chambers 1 and 2 is arranged at a lower level to that of the lower base 8 of the filter vessel 5, so that the inlet 13 of said conduit 3 in the suction chamber is situated below the mentioned lower base 8 of the filter vessel 5.

[0015] An ample hollow space is arranged below the lower base 8 of filter vessel 5 and the impeller assembly 9, which in the case of the first embodiment of the electric pump represented in Figs. 1 to 4 is made up of several vessels 16, 17. Said extensive space can contain a relatively high volume of water which, when the electric pump has started up for the first time, is permanently housed in said ample hollow space.

[0016] The two vessels 16 and 17 are circular in appearance and are solidly joined and communicate with one another by the tubular zone 18, which constitutes the communication conduit 3 between the suction chambers 1 and pressure chamber 2. The assembly of both vessels 16 and 17 is incorporated within a single-piece support 15, which constitutes the electric pump base. Naturally, the mentioned vessels could perfectly well be of a different configuration to that of a circular one, such as, for example, a preferred regular polygonal appearance without going beyond the scope of the invention.

[0017] With the vessels 16 and 17 arranged like this under the suction chamber 1 and pressure chamber 2, respectively, and with the hollow space determined thus, it enables a relatively large volume of water to be contained therein which, once the electric pump has started up for the first time, remains permanently housed in said vessels 16 and 17.

[0018] So that there is a better circulation of water around the entire filter vessel 5, the body walls 21 of the suction chamber 1 and the walls 7 of the filter vessel 5 diverge appreciably from each other. Thus, a wide annular space 27 is determined between both walls for the water circulation.

[0019] The shaft 14 of the electric motor 12 and of the impeller assembly 9 is essentially vertical and said impeller assembly is arranged under the electric motor 12.

[0020] The upper mouth 19 of the first vessel 16 is adapted for receiving the support and hermetic slotting of the open lower base 20 of the body 21 of the suction chamber 1. In turn, the upper mouth 22 of the second vessel 17 is adapted for also receiving the support and hermetic slotting of the open lower base 23 of the body 24 of the suction chamber 2.

[0021] The upper mouths 19 and 22 of the vessels 16 and 17 of the lower support part 15 are provided with a plurality of securing elements 26, made up of internally threaded blind orifices 36 and adapted for securing by means of screws 37 the respective open lower bases 20 and 23 of the bodies 21 and 24 of the suction chamber 1 and pressure chamber 2. Said elements are arranged equidistant to each other, enabling the respective secur-

ing in a plurality of different positions of the bodies 21 and 24 over the mouths 19 and 22 of the cubicle 15. Thanks to this, the position of the suction mouth 4 (shown with continuous line in Fig. 4) can be varied and which can also adopt any one of the positions 4' (shown with dashed line in Fig. 4).

[0022] In the same way, the pressure inlet 25 will also be able to adopt other positions, not represented.

[0023] Likewise, the electric pump 12 cover is joined to the upper part of the body 24 of the pressure chamber 2 by means of a plurality of securing elements 33 which are also equidistant to each other, making it possible to have a corresponding plurality of different positions of said cover in respect of body 24.

[0024] The bottom 29 of both cubicles 16 and 17 of the support part 15 is gently convex for the purpose of increasing its resistance to the water pressure while the electric pump is operating. Moreover, under the bottom 29 several circular 30, and radial 31 ribs are arranged and have the function of resting on the ground to strengthen said resistance.

[0025] Likewise, the part 15 has several arms 32, also adapted for resting on the ground and easing the emplacement and securing within the electric pump.

[0026] Complementarily, the body 24 of the pressure chamber 2 is provided with a micro-orifice 34, adapted for ejecting the air contained in the impelled water which accumulates in the upper part of the pressure chamber 2.

[0027] The support part 15 has the advantage of being equipped, in at least one lower peripheral point, with a drain outlet 35, provided with a cover 38 for optionally easing the extraction of the water accumulated in the vessels 16 and 17.

[0028] The second form of embodiment illustrated in Figs 5 and 6 differs from the first one in that the ample hollow space arranged below the lower base 8 of the filter vessel and the impeller assembly 9 consists of a single vessel 38, preferably devoid of walls or intermediate partitions, although there could be some partition, with resistance purposes, provided with very wide openings for the impelled liquid.

[0029] This single vessel 38, provided with support feet 39 as represented in the drawings, is preferably made from a metallic material, advantageously titanium, for permitting marine applications of the electric pump.

Claims

1. Electric pump for the re-circulation and filtering of swimming pool water, of the type including a suction chamber (1) and a pressure chamber (2), both of which are connected to one another by a communication conduit (3), the first being provided with a water suction inlet (4), wherein the swimming pool water to be filtered and impelled enters, and a filter vessel (5), into which the water drawn in enters by an open upper inlet (6) and exits by multiple small orifices

made in its wall (7) and/or lower base (8), whereas the pressure chamber comprises an impelling assembly (9), driven by a coaxial electric motor (12), and a water outlet (25) for the filtered and impelled water, **characterised in that** the said communication conduit between the suction and pressure chambers is situated completely at a level underneath the filter vessel lower base; and the shaft of the motor and of the impeller assembly is essentially vertical; and **in that** below the lower base (8) of the filter vessel (5) and the impeller assembly (9) an ample hollow space (16, 17) is arranged and capable of containing a relatively high volume of water which, once the electric pump has started up for the first time, remains permanently housed in said ample hollow space.

2. Electric pump for swimming pools in accordance with claim 1, **characterised in that** the body walls (21) of the suction chamber (1) and the walls (7) of the filter vessel (5) diverge appreciably from one another, so that between both walls a wide space (27) for the circulation of water is determined.

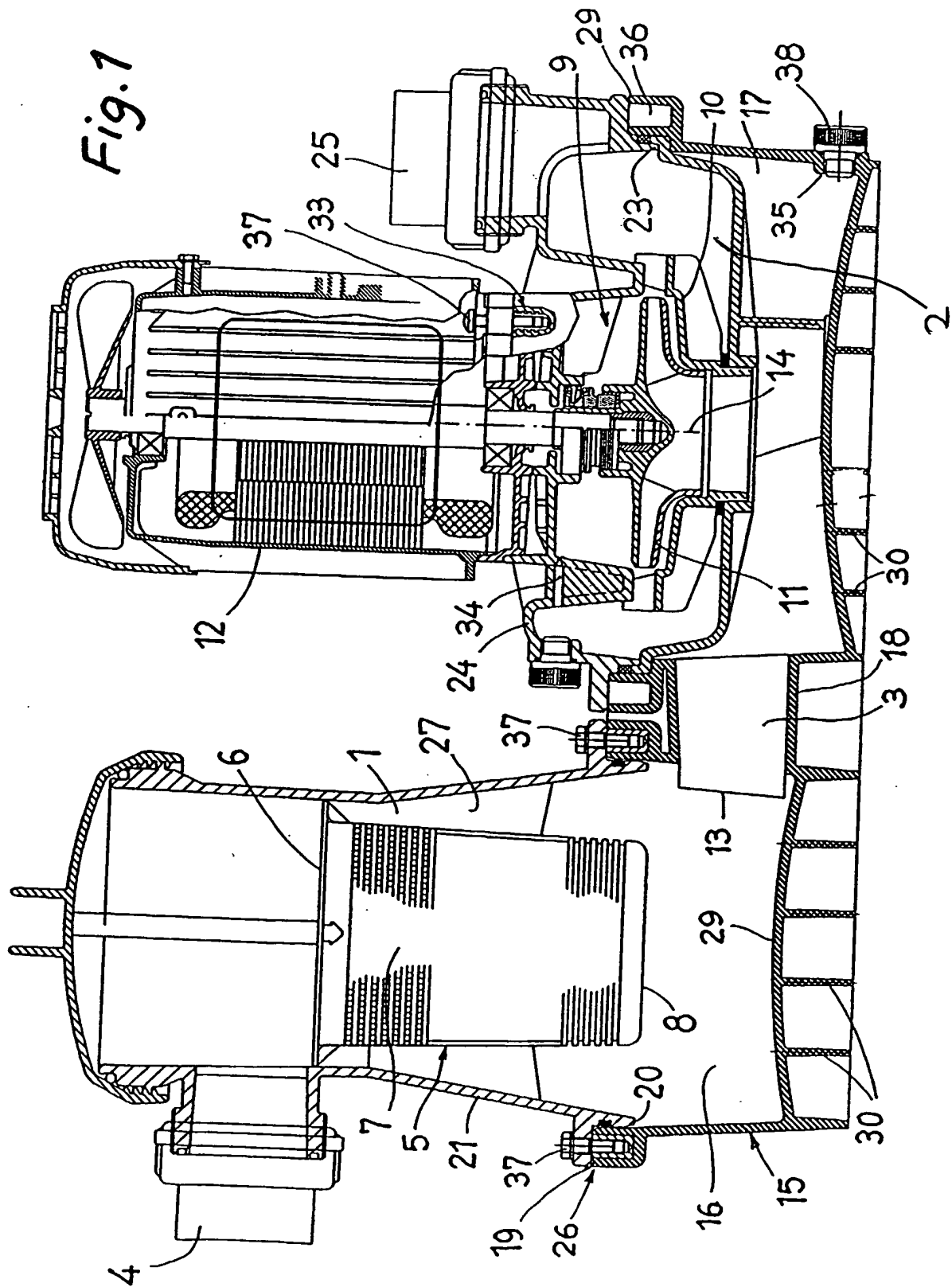
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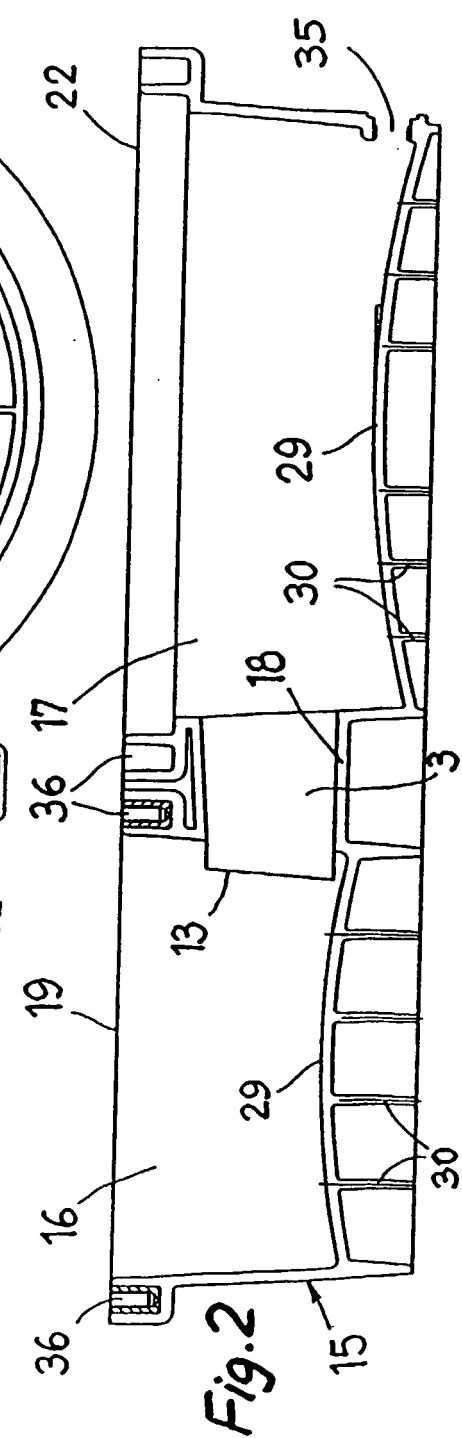
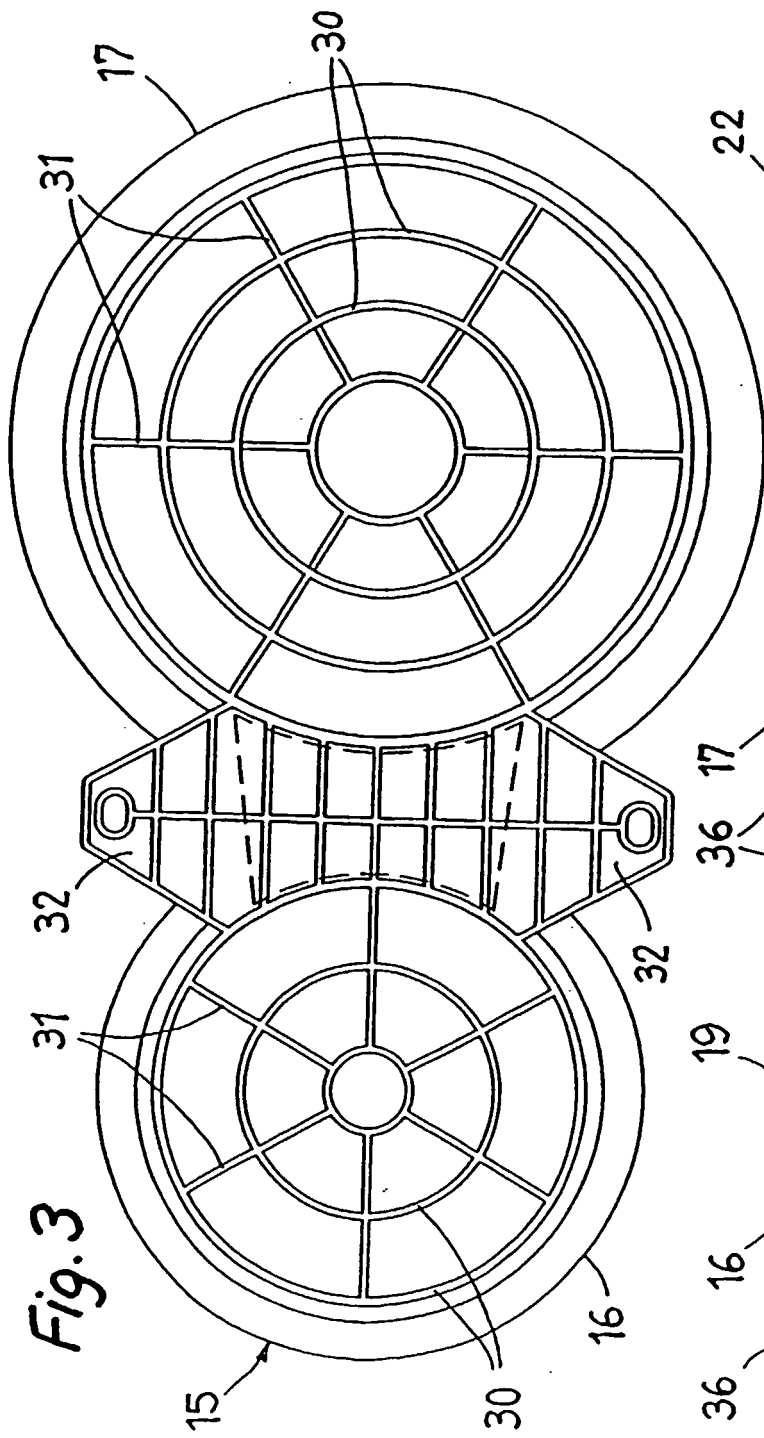
1. Elektropumpe zum Rezirkulieren von Schwimmbekkenwasser, derart beinhaltend eine Saugkammer (1) und eine Druckkammer (2), die beide durch eine Verbindungsleitung (3) miteinander verbunden sind, wobei erstere mit einem Wassersaugeinlass (4) versehen ist, in welchen das zu filternde und anzutreibende Schwimmbekkenwasser eintritt, und mit einem Filterbehälter (5), in welchen das eingesaugte Wasser durch einen offenen oberen Einlass (6) eintritt und durch mehrere kleine in ihre Wand (7) und/oder unteren Boden (8) eingebrachte Löcher austritt, während die Druckkammer eine Antriebsanordnung (9) umfasst, welche durch einen koaxialen Elektromotor (12) angetrieben wird, und einen Wasserauslass (25) für das gefilterte und angetriebene Wasser, **dadurch gekennzeichnet, dass** die genannte Verbindungsleitung zwischen der Saugkammer und der Druckkammer vollständig auf einer Höhe unterhalb des unteren Bodens des Filterbehälters gelegen ist; und dass die Welle des Motors und der Antriebsanordnung im wesentlichen vertikal ist; und dass unter dem unteren Boden (8) des Filterbehälters (5) und der Antriebsanordnung (9) ein großer Hohlraum (16, 17) angeordnet ist, welcher ein relativ großes Volumen an Wasser aufnehmen kann, welches nach erstmaligem Anlaufen der elektrischen Pumpe permanent in dem genannten großen Hohlraum verbleibt.
2. Elektropumpe für Schwimmbekken nach Anspruch 1, **dadurch gekennzeichnet, dass** die Körperwän-

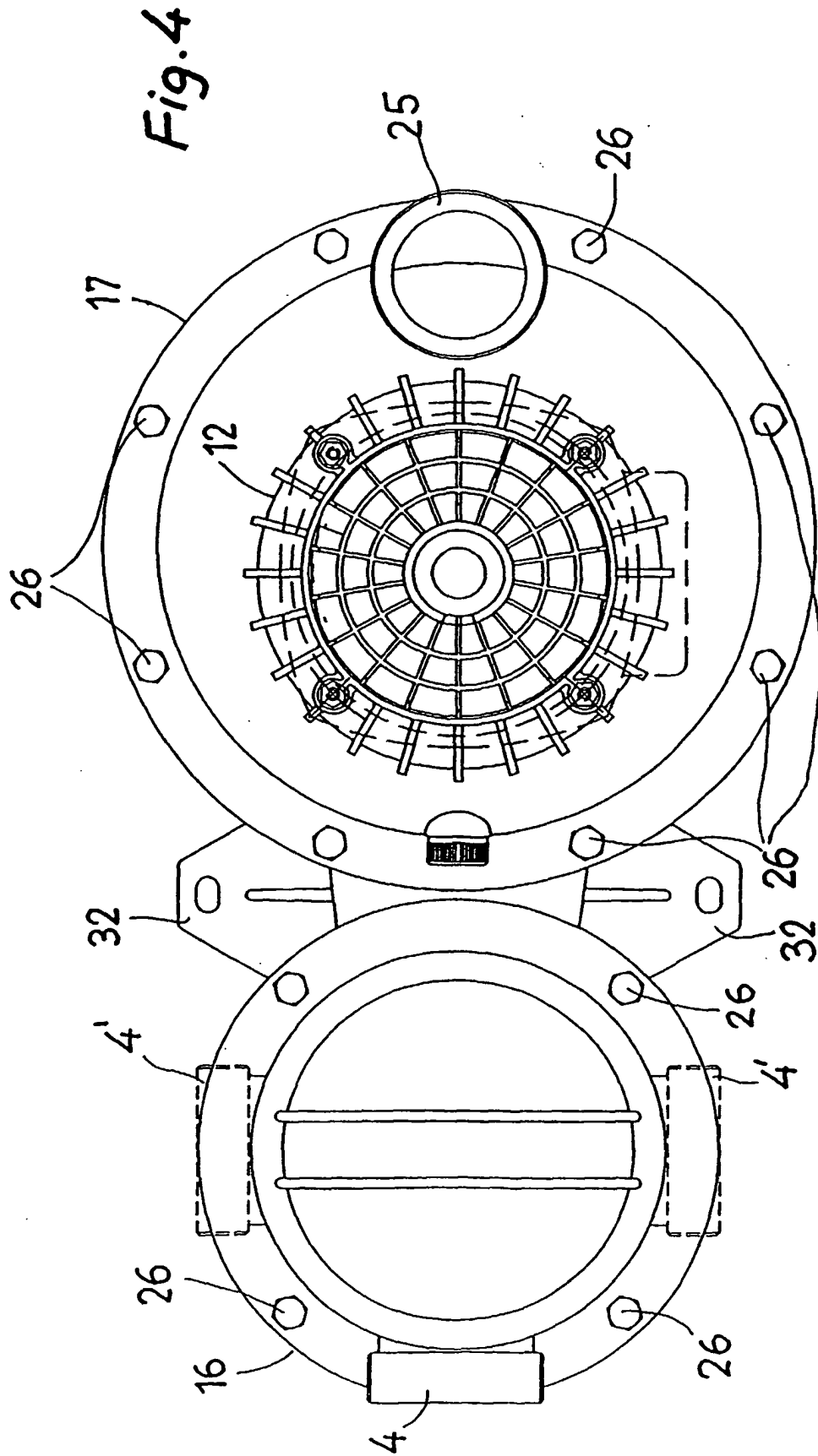
de (21) der Saugkammer (1) und die Wände (7) des Filterbehälters (5) deutlich auseinanderlaufen, so dass zwischen beiden Wänden ein weiter Raum (27) für das Zirkulieren von Wasser festgelegt wird.

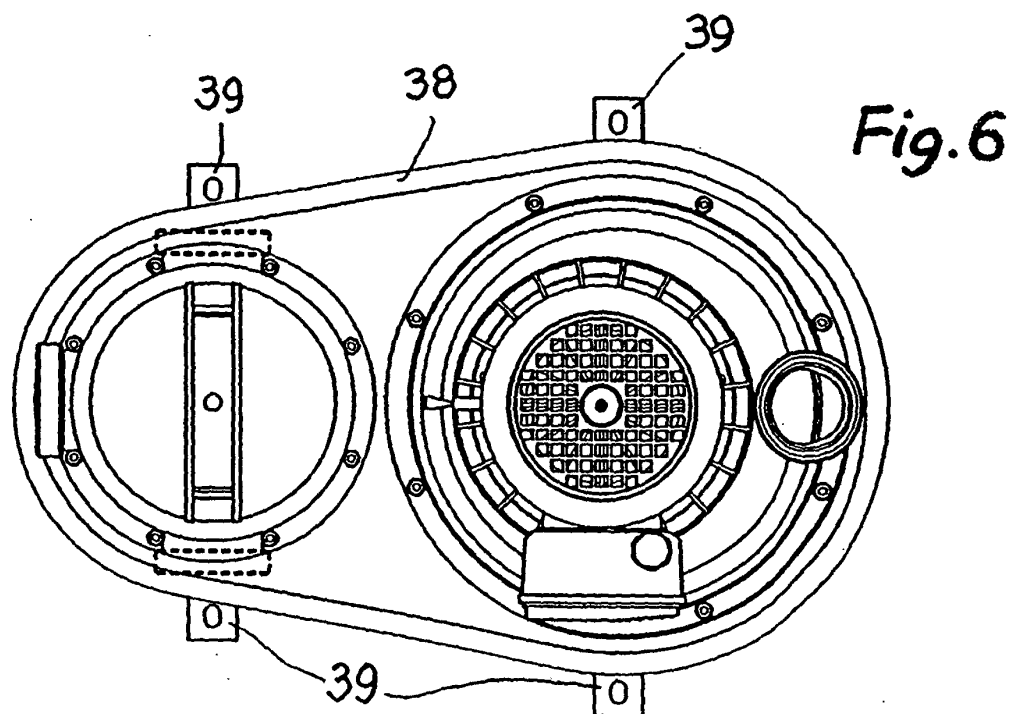
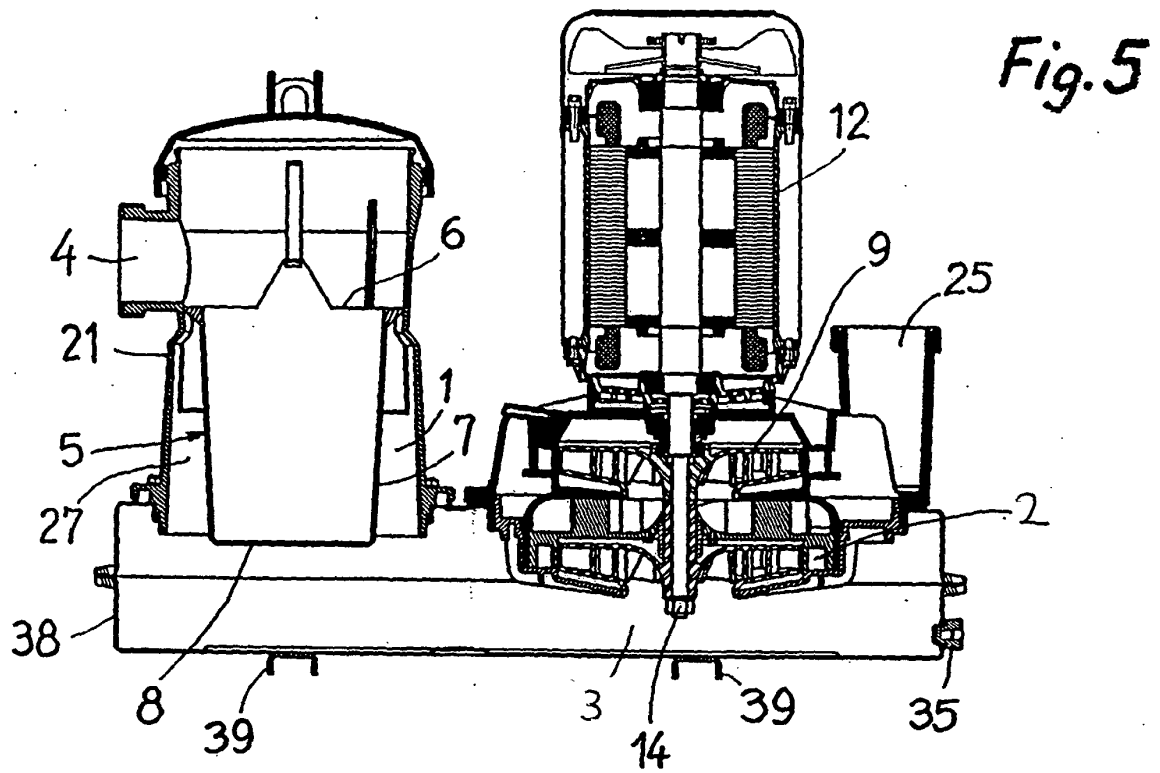
Revendications

1. Pompe électrique pour la recirculation et le filtrage de l'eau d'une piscine, du type incluant une chambre de succion (1) et une chambre de pression (2), toutes deux étant connectées l'une à l'autre par une conduite de communication (3), la première étant pourvue d'une entrée de succion d'eau (4), dans laquelle pénètre l'eau de la piscine à filtrer et à impulser, et d'un récipient de filtre (5), dans lequel l'eau aspirée pénètre à travers une entrée supérieure ouverte (6) et sort par de multiples petits orifices pratiqués dans sa paroi (7) et/ou une base inférieure (8), tandis que la chambre de pression comprend un ensemble d'impulsion (9) entraîné par un moteur (12) électrique coaxial, et une sortie d'eau (25) pour l'eau filtrée et impulsée, **caractérisée en ce que** ladite conduite de communication entre les chambres de succion et de pression est située complètement à un niveau sous la base inférieure du récipient de filtre ; et l'arbre du moteur et de l'ensemble impulseur est essentiellement vertical ; et **en ce que** sous la base inférieure (8) du récipient de filtre (5) et de l'ensemble impulseur (9) est disposé un espace creux et ample (16, 17) qui peut contenir un volume relativement élevé d'eau qui, une fois que la pompe électrique est mise en marche pour la première fois, demeure logé en permanence dans ledit espace creux et ample.
2. Pompe électrique pour piscines selon la revendication 1, **caractérisée en ce que** les parois (21) de corps de la chambre (1) de succion et les parois (7) du récipient de filtre (5) divergent sensiblement l'une de l'autre, de manière à ce qu'entre les deux parois est établi un large espace (27) pour la circulation de l'eau.









REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 2297338 [0002]
- US 5178523 A [0002]
- ES 284474 U [0002]
- ES 291043 U [0002]
- ES 9801562 U [0002]
- EP 544610 A [0002]
- EP 657602 A [0002]
- GB 379738 A [0002]
- GB 500072 A [0002]
- EP 0992685 A [0005]